

Green Technology Adoption in Business

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Abstract: Dealing with the issue of air and water pollution, which is becoming a more significant concern with detrimental effects on the environment and human health, requires the use of new technology. In order to speed up sustainable development (SD), several advances in manufacturing processes have been brought about by recent developments in green and creative technology. Adoption of green technologies, however, may be sluggish if the new technologies are not better in terms of the firms' private incentives, if the firms have lengthy equipment replacement cycles, or if the firms lack the necessary information to determine whether or not switching to a green technology is in their private interests. Green innovation adoption (GIA) has several advantages, yet manufacturing organizations continue to adopt these projects at a dismal rate. We have created and proven the GIA model, which is based on the unified theory of acceptance and use of technology (UTAUT), to close this gap and force organizations to adopt these innovative technologies.

Keywords: Green Technology Adoption, Sustainable Development (SD), Air and Water Pollution, Manufacturing Processes, Green Innovation Adoption (GIA), Environmental Sustainability, Private Incentives, Technology Acceptance

1. INTRODUCTION

Innovations aimed at improving the environment and conserving resources are generally referred to as green technologies. They include eco-friendly materials, cutting-edge waste management techniques, and renewable energy sources like solar and wind. Their dedication to sustainability, which aims to reduce ecological footprints, conserve resources, and improve energy efficiency, is at the heart of their design. These technologies represent a dramatic departure from conventional methods and a move toward sustainable alternatives in the fight against global environmental issues including resource shortages and climate change. Additionally, green technologies represent a paradigm shift in economics and industry. By questioning established company models and encouraging sustainable business practices, they present fresh chances for expansion and improvement. The growth of green tech companies and investments in sustainable ideas are clear indicators of this change. Green technology adoption is not without its difficulties, though. Their development and use are still severely hampered by problems including exorbitant upfront expenditures, technical constraints, and legal restrictions. Notwithstanding these obstacles, the unrelenting development and uptake of green technology points to a bright future.

2. THE 4 PILLARS OF GREEN TECHNOLOGY

The four pillars of green technology represent key principles that guide the development and implementation of sustainable technologies to address environmental challenges. These pillars include:

- Energy efficiency: Green technology prioritises reducing energy consumption and enhancing efficiency in operations, systems, and processes. This includes innovations like energy-efficient appliances, smart grids, LED lighting, and improved insulation techniques to lower energy waste and emissions.
- Renewable energy: The shift from fossil fuels to clean, renewable energy sources is a cornerstone of green technology. Technologies that harness solar, wind, hydroelectric, geothermal, and biomass energy help meet global energy demands sustainably, reducing greenhouse gas emissions and reliance on finite resources.
- Waste reduction and management: This pillar minimises waste generation through recycling, reusing, and adopting circular economy models. Technologies that convert waste into valuable resources (e.g.,

waste-to-energy systems) and innovations in sustainable packaging aim to reduce landfill burden and environmental impact.

Sustainable design and innovation: Green technology involves designing products, infrastructure, and systems that minimise environmental harm. This includes using eco-friendly materials, promoting biodegradable products, and creating technologies that integrate seamlessly with nature. Sustainable design focuses on longevity, resource optimisation, and reducing environmental footprints

3. TYPES OF GREEN TECHNOLOGIES

Green technologies in 2024 will be diverse, catering to various aspects of sustainability. Renewable energy technologies for energy production, such as solar and wind power, are at the forefront, offering alternatives to fossil fuels. Greenly highlights the increasing importance of these energy sources. Energy efficiency technologies, focusing on reducing energy consumption in buildings and industries, are also critical. Green transportation technologies, including electric vehicles and sustainable public transit systems, are gaining momentum. Furthermore, waste management technologies are revolutionising the way we handle waste, turning it into sustainable resources or energy. In addition, green fuels which are fuels extracted from animal and plant materials. Lastly, sustainable materials are replacing traditional, non-renewable materials in the construction industry. These varied types of technologies underscore the comprehensive scope they can have in addressing environmental challenges.

4. KEY AREAS OF GREEN TECHNOLOGY IN BUSINESS

- Renewable Energy: To lessen their need on fossil fuels, businesses are investing in hydroelectric power, wind energy, and solar panels.
- Energy Efficiency: To cut down on energy use, adopt smart thermostats, LED lighting, energy- efficient appliances, and automation systems.
- Sustainable Manufacturing: Utilizing eco-friendly production methods, waste reduction strategies, and biodegradable materials.
- Green supply chains: employing eco-friendly packaging, maximizing logistics for reduced emissions, and sourcing raw materials responsibly.
- trash Management & Recycling: To reduce the impact on landfills, implement trash reduction programs, recycling initiatives, and composting.
- Water Conservation: Installing rainwater collection systems, wastewater treatment systems, and waterefficient fixtures.
- ➢ Green IT: Utilizing cloud computing, energy-efficient data centres, and e-waste recycling initiatives

5. BENEFITS OF GREEN TECHNOLOGY ADOPTION

- > Cost Savings: Long-term operating expenses are decreased by using less energy and resources.
- Regulatory Compliance: Adheres to environmental and governmental regulations.
- Competitive advantage: Draws in investors and eco-aware customers.
- > Brand Reputation: Improves consumer loyalty and public perception.
- > Innovation & Growth: Promotes the creation of green products and new business models.

6. CHALLENGES IN ADOPTION

- ▶ High Initial Costs: Some green technologies require significant upfront investment.
- > Lack of Awareness: Businesses may not fully understand the long-term benefits.
- > Resistance to Change: Employees and stakeholders may be hesitant to transition.
- > Technology Limitations: Some green solutions may still be in development or not widely available

7. LEADING GREEN TECHNOLOGY INNOVATIONS IN 2024

In 2024, the green technology landscape will be marked by several groundbreaking innovations. One significant development is in the realm of solar energy, where advances have led to more efficient and

affordable solar panels, making renewable energy from solar energy accessible to a broader audience. Another area of notable progress is in electric vehicle (EV) technology. EVs are becoming more mainstream, thanks to improvements in battery life and charging infrastructure.

- Waste management technologies are also transforming. Innovations in recycling and waste- to-energy processes are enabling more sustainable management of resources. These technologies have the potential to reduce landfill waste and greenhouse gas emissions.
- Moreover, green architecture is gaining momentum, with sustainable buildings designed for energy efficiency and minimal environmental impact. These structures utilise
- sustainable materials and incorporate features like green roofs and energy-efficient lighting, contributing significantly to urban sustainability and lowering temperatures in adjacent areas.
- ➢ In the agricultural sector, sustainable farming technologies are evolving. Techniques like precision farming, which uses Artificial Intelligence (AI) and the Internet of Things (IoT) for efficient resource usage, are revolutionising food production, making it more sustainable and less harmful to the environment.
- These examples illustrate the dynamic and impactful nature of green technologies. They are not just transforming industries but are also paving the way for a more sustainable and eco-friendly future. The continued evolution and adoption of these technologies will be crucial in addressing the global environmental challenges of our time

8. CASE STUDIES OF EFFECTIVE GREEN TECHNOLOGY IMPLEMENTATION

Tesla: Tesla has revolutionised the automotive industry by popularising electric vehicles (EVs) as a sustainable alternative to traditional fossil fuel-powered cars. The company also develops solar energy systems and energy storage solutions.

Green Technology Implementation:

- Tesla's Model 3 became the world's best-selling EV, proving that electric vehicles can be both efficient and desirable.
- Tesla Powerwall and Powerpack allow homes and businesses to store renewable energy, further reducing carbon footprints.
- > Tesla's Gigafactories are powered by renewable energy, focusing on reducing manufacturing emissions.
- Figure 2 Impact: Tesla has helped prevent millions of tonnes of CO₂ emissions annually and encouraged other

9. SINGAPORE'S MARINA ONE

Marina One, an award-winning development in Singapore, is a prime example of green building design integrated with sustainable technology.

Green Technology Implementation:

- The building features a "green heart", a lush garden spanning over 65,000 square feet to promote natural cooling and biodiversity.
- Energy-efficient systems include advanced ventilation and solar shading, reducing the building's energy needs.
- It incorporates rainwater harvesting and greywater recycling systems to conserve water. Impact: Marina One reduces energy consumption by 30 percent compared to conventional buildings, setting new benchmarks for sustainable architecture

Orsted: Orsted, a Danish energy company, transitioned from fossil fuels to become a global leader in offshore wind energy.

Green Technology Implementation:

- Orsted developed several large-scale offshore wind farms in Europe, Asia, and the United States, harnessing clean energy from wind power.
- > The company integrates smart grid technologies to optimise renewable energy distribution.

Impact: Orsted reduced its carbon emissions by over 87 percent since 2006 and aims to achieve carbon neutrality by 2025. Their efforts supply millions of homes with clean energy and pave the way for other energy companies to transition

10. CONCLUSION

Investigating green technologies exposes a world full of possibilities and inventiveness. These technologies are essential to creating a sustainable future; they are not just fads. Every development, from green building to renewable energy, makes a substantial contribution to sustainable living and environmental preservation. Though significant, the issues are gradually being resolved by advances in technology and societal trends toward sustainability. Green technologies will only play a bigger part in our lives as time goes on, bringing with it a new level of environmental awareness and accountability.

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